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Method for Holding Taut a Weft Thread and a Loom for Carrying Out Said Method

The invention relates to a method for the holding-taut of a weft thread in the mixing or blending tube of the main jet or nozzle of an air jet loom, whereby a length section or segment of the weft thread supplied from preferably a pre-spooling device or accumulator is impinged on by an air stream exerting a tension force onto the weft thread in the mixing tube of the main nozzle during a predetermined time duration, which air stream is at a predetermined pressure level.

The invention further relates to an air jet loom for the carrying out of the method with at least one pneumatically impingeable weft thread insertion means comprising a mixing or blending tube, with at least one controllable valve operatively connected via a pressure line with the weft thread insertion means for impinging on the length section or segment of a weft thread supplied from preferably a pre-spooling device or accumulator, which length section is to be held stretched or taut in the mixing tube, with a predetermined pressure level of an air stream, with at least one pneumatic pressure source and with a memory programmable loom controller for the controlled activation of the at least one controllable valve.

As generally known, on air jet looms, the weft thread that is to be inserted into the loom shed is made available with predetermined length to the pneumatically acting weft thread insertion means, referred to as main nozzle in the following,
5 from a so-called thread store or pre-spooling device or accumulator.

A length section or segment of the weft thread to be inserted into the loom shed is located in the mixing or blending tube of the main nozzle, while a further length section of the weft thread is located between the main nozzle and the thread store and on the thread store itself, and is held securely on the thread store through suitable means for the time duration of at
10 least one weaving cycle.

The length section of the weft thread located in the mixing tube of the main nozzle is held stretched or taut with the aid of an air stream acting in the direction of the longitudinal center axis of the mixing tube. If plural main nozzles are being used for the production of a woven web or fabric, then the time for the stretched-holding or taut-holding of the weft thread
15 increases generally by an amount that can encompass plural weaving cycles.

Depending on the structure of the weft threads, the stretched-holding or taut-holding of the weft thread continuing over a longer time duration can lead to damages, which especially
20 arise as weft thread breaks, which become evident as a change of

the thread structure, and which finally lead to decisions to limit the range of application of the air jet loom.

Object of the invention is to avoid the above mentioned disadvantages.

5 According to the invention, the object is achieved in that an air stream at a predetermined pressure level P2 is given off or emitted during a predetermined time duration at an angle that is greater than zero degrees to the longitudinal center axis of the mixing tube onto the end region of the length section of the weft
10 thread held in the mixing tube of the main nozzle.

In that regard, the predetermined time duration of the impingement of the weft thread end region in that regard corresponds to at least the duration of a weaving cycle.

15 In other words, the duration of the impingement of the weft thread end region is greater than one weaving cycle when, in a pattern dependent manner, plural main nozzles are used for the production of a woven web or fabric.

It is thus essential according to the invention, that the air stream acting on the weft thread end region is emitted or given
20 off at an angle to the longitudinal center axis of the mixing tube. Thereby, the front or forward end of the weft thread is deflected out of approximately the plane of the longitudinal center axis of the mixing tube. Thus, the air stream acting on

the weft thread end region holds the weft thread stretched or taut from the thread store up to the deflection point in the mixing tube. Thus, up to the deflection point in the mixing tube, the structure of the weft thread is not influenced by the
5 so-called holding air. In that regard, the deflected weft thread end region is fixed in its length so that it can be cut off after the insertion of the weft thread into the loom shed and after its binding-in by the warp threads. Therefore, the weft thread end region with its structure possibly changed by the holding air is
10 not a component of the produced woven web or fabric.

For the carrying out of the method features, it is provided according to the invention, that the mixing tube of the main nozzle comprises, in the area of its free end, an arrangement that deflects the forward or front end of the weft thread out of
15 the plane of the longitudinal center axis of the mixing tube by means of an air stream. For that purpose, there is provided an inlet channel with outlet penetrating through the wall of the mixing tube, for example at a right angle to the longitudinal center axis of the mixing tube, and an inlet of an outlet channel
20 arranged lying diametrically opposite the outlet of the inlet channel. The inlet channel is connected via a pressure line with a valve activatable by the loom controller.

Alternatively, the arrangement can consist of a separate connection piece, that is connected with the free end of the
25 mixing tube, or it can consist of a separate intermediate piece that is incorporated into the mixing tube. Also here, the

connection piece or the intermediate piece has an inlet channel with outlet and an inlet of an outlet channel arranged lying diametrically opposite the outlet of the inlet channel.

In a preferred embodiment of the arrangement, the center axis of
5 the inlet and outlet channel is arranged perpendicularly to the longitudinal center axis of the mixing tube.

The advantage achieved with the inventive solution essentially consists in that the structural changes arising due to the holding air are limited to the weft thread end region and that
10 such an end region is not included in the produced woven web or fabric.

In the following, the invention will be explained in connection with an example embodiment. In Fig. 1, the accompanying drawing shows a perspective view of the main nozzle 1 of an air jet loom
15 in lengthwise section.

The main nozzle 1 encompasses the injector 3 that is screwable into the mixing tube body 2, and the mixing tube 4 connected with the mixing tube body 2.

In the area of the free end of the mixing tube 4, according to
20 the invention there is provided an arrangement, which enables the deflection of the forward or front end 5a of a weft thread 5 out of approximately the plane of the longitudinal center axis 4a of the mixing tube 4 by means of an air stream in the direction of

the vertically extending longitudinal center axis 17 of the arrangement. The directional arrow, symbolically illustrated as pressure line 8, indicates the flow direction of the air stream. In detail, the arrangement consists of an inlet channel 6
5 penetrating preferably perpendicularly through the wall 4b of the mixing tube 4, and an inlet 7a of an outlet channel 7 arranged diametrically opposite the outlet 6a of the inlet channel 6.

The pressure P2 of the air stream supplied by a pressure source
10 prevails at a valve 9, which is, for example, an electromagnetically controlled valve. The valve 9 is connected with the control electronics 11 of the loom via the control line 12 in a signal transmitting manner. The pressure P1 of an air stream, which air stream is symbolically illustrated by a directional arrow, and which impinges on the weft thread 5 in a pulsed manner via the pressure line 15, prevails at a further valve 13, which is similarly connected with the control electronics 11 of the loom in a signal transmitting manner via the control line 14. This air stream serves for the insertion of the weft thread into the loom shed. For the understanding of
20 the inventive solution it is still further mentioned, that after the weft thread 5 is inserted into the loom shed by means of the air stream at the pressure level P1, the air stream in the line 15 is blocked via the control electronics 11 and the valve 12, and thereupon the other air stream is provided via the valve 9 of the arrangement 6, 7 for the stretched-holding or taut-holding
25 of the weft thread 5. These processes are continuously repeated in the production of a woven web or fabric.

Drawing-Legend

- 1 main nozzle or jet
- 2 mixing or blending tube body
- 3 injector
- 5 4 mixing or blending tube
- 4a longitudinal center axis
- 4b wall
- 5 weft thread
- 5a front end
- 10 6 inlet channel
- 6a outlet
- 7 outlet channel
- 7a inlet
- 8 pressure line
- 15 9 valve
- 10 pressure source
- 11 control electronics
- 12 control line
- 13 valve
- 20 14 control line
- 15 pressure line
- 16 connection piece
- 16a inlet channel
- 16a' outlet
- 25 16b outlet channel
- 16b' outlet
- 17 longitudinal center axis